



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

RAILROAD AND PUBLIC TIME.

IN a former paper,* the part which the railroads were to play in bringing about convenient time standards in the United States was fully pointed out. There appeared recently an official expression of the opinion of the railroad managers, written by the Secretary of the General and Southern Railway Time Conventions, which so clearly indicated the desirability of introducing hourly standards, that it is now generally agreed among the railroad people that the fall and winter time-tables are to be made up according to the new standards of time.† The resolutions do not advocate any rigid division of standards of time by astronomical meridians, but very sensibly keep communities and railroads which are associated to the same standard. Thus, for instance, the first resolution implies that Portland, Boston, Providence, New London, New York, Montreal, Albany, Philadelphia, Baltimore, Toronto, Hamilton, Washington, Richmond, and Charleston, and the railroads connecting these points, are to use the "Eastern," or 75th meridian time. "Central" time, or the 105th meridian, will be used by the great system of railroads lying west of Pittsburg and Savannah and east of Toyah on the Texas Pacific, and Whitewood on the Northern Pacific. The names to be given to the various standards are, for the 60th meridian west of Greenwich, "Intercolonial"; for the 75th meridian, "Eastern"; for the 90th meridian, "Central";

* North American Review, December, 1880.

† Report on the subject of National Standard Time made to the General and Southern Railway Time Conventions, held in St. Louis, April 11, 1883, and in New York City, April 18, 1883; and directed to be forwarded, with accompanying map, to the managing officer of each railway line situated in the United States and the Dominion of Canada, together with other papers relating thereto. By W. F. Allen, Secretary of the Conventions. National Railway Publication Company Print, 46 Bond street, New York.

for the 105th meridian, "Mountain"; and for the 120th meridian, "Pacific" time. It will be seen that the only change in these names from those previously proposed is in calling Atlantic time "Eastern" time and Eastern time "Intercolonial" time. "Atlantic" corresponds with "Pacific," and there does not seem to be any very good reason for the change.

So much for the scheme of the railroad people. When it goes into operation, there will be a little dissenting by the almanac makers and a little more by the people who would like to see absolutely the same time from one end of the country to the other; but all the rest of us will change our watches and clocks, and forget the inconvenience and irritation of preceding years and only know that everybody keeps the same time that we do. The traveler from Chicago will know that his watch is an hour slow when he leaves Pittsburg coming east, and the traveler from Quebec to Charleston that he is an hour fast when he leaves St. Augustine for Winnipeg. Fortunately our Eastern time meridian passes between New York and Philadelphia, and the Central meridian passes between Chicago and St. Louis. These are very nearly population centers, and the very large majority therefore of the population of the country will have the true local time practically coincident with the public time in use. In such a State as Ohio, however, in which the local time will be half an hour fast of the public time, there will be certain days about the 1st of November in which the sun will cross the meridian about a quarter past eleven, Central time, and a quarter before twelve about February 20th. The extreme effect in November will be to shorten the business mornings, and to lengthen the business afternoons, by three-quarters of an hour, or half an hour less or more than at present. In Pittsburg and in western New York the effect will be just the opposite. In England, where the extreme difference of time between the Greenwich standard time and the local time in the extreme West is also about half an hour, the variance is not felt as a business inconvenience. In our country, with our brighter skies and our greater dependence on daylight, our banks and commercial bodies may find it expedient to alter their nominal times of doing business by half an hour, wherever the change of times is most perceptible.

With the general adoption of such uniform standard time comes the question of supply and transmission of time for public use. It might appear that the U. S. Naval Observatory

should be the chief source and center for the distribution of time in the United States. This ought not, however, to be the case, nor would it prove most profitable to the scientific interests of the country that it should be so. The private observatories, by which is meant those not supported by the General Government, have been for many years the teachers of the public on the time question. Most of them are telegraphically connected with the cities and railroads in their vicinity, and are performing the work of furnishing the time to the satisfaction and convenience of all concerned. They are living examples to the business men around them of the usefulness of astronomical science in every-day life. They earn from their time services sums of money, small to be sure, but sufficient in the aggregate to enable them to do a fair amount of purely scientific work; and in some cases observatories are kept alive by their income from this source. Time for commercial use is about the only incidental product of an astronomical observatory. It is the first thing the astronomer must have, and he must have it constantly. It is not therefore a business venture with its attendant risks for an observatory to "sell time." It is rather the utilization of a product which will otherwise be unused. There is no pretense that the Naval Observatory will do the work better than it is now done by the best private observatories, and it is to be hoped that well enough will be let alone. There are large areas of territory, particularly in the South, where there are no private observatories, which will naturally look to the Naval Observatory in the future, as they have in the past, for their standard time.

It is doubtless within the province of Congress to introduce national legislation on this subject as pertaining to interstate commerce. Until such legislation is established, either by Congress or the separate States, the question as to what is legally the time of day will occasionally be in dispute. The General Assembly of the State of Connecticut, at its January session, 1881, passed by a unanimous vote, "An Act establishing a Standard of Time." In this act the Legislature assumed the right to establish a standard time meridian, to make a contract for the obtaining of an accurate time standard, and to require the railroads of the State, as a measure of public safety in railroad traffic, to transmit and display this time. Bills with the same object in view have been introduced in the legislatures of

other States, and it can only be a short time until the time question will be a common subject of legislation. The operation of the law referred to, in Connecticut, has been watched by the Board of Railroad Commissioners, and at the close of the first and second years of its working they speak of it with commendation. They say in their report for 1881:

"The importance of accuracy and uniformity, both as a means of preventing accidents and of determining responsibility, when one occurs, needs no argument.

"In the case of one accident during the year, the evidence was conflicting, whether it occurred at a certain time or four minutes later, and upon that difference of four minutes depended the determination of the question whether a rule of the company had been violated or not. If the accident occurred at the later time the rule was violated, while a compliance with it would have prevented the accident.

"In another instance, which, like the former, was a rear collision, had this system been in use, and the time-pieces of the conductors and engineers corrected by a standard time on starting out, a half hour before the accident, in all probability it would not have occurred, but if it had, there would have been no question as to where the entire responsibility rested.

"Not only is there no absolute uniformity of time among all our roads, but there is no attempt at it, except among those named, and approximately on some connecting lines. East of the Connecticut River there are three standards, and two west of the river . . .

"Did the advantages and profit of this uniformity accrue solely, or even chiefly, to the railroad companies, then the expense of determining and distributing the standard time would properly be charged to them, but its advantages extend to all classes, and the distribution of the cost should be co-extensive."

The merchants, manufacturers, and railroad people unite in their favorable opinion of the law, and the consequent cessation of vexatious time differences in the State. The time is furnished, transmitted, and displayed throughout the State with precision and regularity, and no opinion has yet been expressed that the State is otherwise than a gainer by its contracts for furnishing the time. The experiment is referred to here as affording an example of what may be done elsewhere to the mutual advantage of the States and observatories within their borders.

Connected with the time question for a single country like ours is that of international time, to which the new name has been given of Cosmopolitan time. President Barnard has ex-

plained * and supported this system, and an International Commission has been proposed to consider it. In this system the prime meridian is one hundred and eighty degrees, or twelve hours, from Greenwich, passes near Behring Strait, and lies almost wholly in the ocean. The day begins at midnight, and the hours are counted up to twenty-four. At intervals of an hour from the prime meridian occur the secondary meridians. These meridians are designated by the consecutive letters of the alphabet omitting J and V. The minutes and seconds would be the same the world over in Cosmopolitan time, and the local time at any place would be found by subtracting the number of hours corresponding to the standard meridian from which the local time is reckoned, local time signifying the time of the nearest hourly standard meridian. This is very convenient for navigators, since the "change of count" takes place near the prime meridian, and events recorded in Cosmopolitan time are comparable, without considering differences in longitude.

The necessity of uniformity in time is so generally recognized that projects for its display are already enlisting capital in a new branch of industry. In Paris, Berlin, Vienna, London, and more recently in New Haven and New York, stock companies have been formed for the purpose of regularly selling time to whoever wants to buy. These companies, which are financially quite successful abroad, where the results of the experiment have already accumulated, receive the time from the astronomical observatories, and by means of systems of pneumatic tubes, or telegraph lines, or both combined, they transmit the time to clock-dial indicators in the houses or places of business of their subscribers. Instead of buying a clock, the coming householder pays a new tax in addition to that for gas and water, and new monopolies for furnishing time to streets and city houses will in the not distant future plague the city fathers.

* Preamble and resolution submitted to the Association for the Reform and Codification of the Law of Nations, at their meeting in August, 1881, at Cologne, in Rhine-Prussia, by President F. A. P. Barnard, of Columbia College.

LEONARD WALDO.